

FURTHER REMARKS ON THE COASTAL PLAIN PLANTS  
OF NEW ENGLAND, THEIR HISTORY AND  
DISTRIBUTION.

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SINCE the publication of my preliminary paper on this subject, in RHODORA last April, I have accumulated some more evidence on the same lines, which is presented herewith. At the same time I take this opportunity to correct some geographical errors which crept into the former paper. In defining the coastal plain, I unaccountably overlooked the fact that the areas of Triassic rocks along the fall-line in New Jersey, North Carolina and elsewhere are usually classed with the Piedmont region rather than with the coastal plain. Cretaceous should therefore be substituted for Mesozoic in the first paragraph.

I also failed to notice that there is one eastern state which contains neither coastal plain nor glacial drift, as far as known; namely, West Virginia. It is of considerable interest therefore to determine which if any of the plants recorded as being nearly confined to the Pleistocene formations occur in that state. Fortunately there is an excellent flora of West Virginia, by Dr. Millspaugh, published in 1892, and on referring to it I find the following items of interest. The genera *Xyris*, *Eriocaulon*, *Pontederia*, *Tofieldia*, *Sarracenia* and *Utricularia* are not mentioned in the catalogue at all, though most of them are probably represented in all the surrounding states. *Potamogeton* and *Drosera* are each represented by only one species, the former from two counties and the latter from one. Among the species enumerated in my preliminary list *Sagittaria graminea* is reported from only one county, *Dulichium* from two, *Eleocharis tuberculosa* from one, *Eriophorum Virginicum* from two, *Habenaria ciliaris* and *Rosa Carolina* from three, *Aronia arbutifolia* from four, *Polygala cruciata* from two, *Viola lanceolata* from one, *Rhexia Virginica* from seven, *Azalea viscosa* from four, and *Pieris Mariana* and *Gaylussacia dumosa* from two. But it will be noticed that I have already indicated the occurrence of nearly all of these at isolated stations in and near the mountains in the states farther south. In a later edition of his flora (1896) Dr. Millspaugh says: "There is to-day neither pond nor lake within the limits of the State." This corroborates a statement on page 76 of my former paper.

As for the age of these coastal plain species, some of them seem to be a little older than I formerly supposed. *Dulichium* has recently been reported in a fossil state from interglacial deposits in Denmark,<sup>1</sup> and in Dr. Knowlton's catalogue of Cretaceous and Tertiary plants of North America (Bull. 152, U. S. Geol. Surv., 1898) *Chamaecyparis*, *Brasenia*, *Drosera rotundifolia* and several existing species of *Potamogeton* are reported from Pleistocene deposits in Canada or New Jersey, and *Celthra alnifolia* and *Leucothoe racemosa* from Miocene in New Jersey. But on account of the fragmentary nature of the fossil material it is perhaps not safe to claim absolute specific identity with living plants. Dr. Hollick, who reported the two last-named species, now admits that their specific relationships are very doubtful. It is altogether likely however that some of the species mentioned in my former list are of more recent origin than others, and it may some time be possible to classify them according to age with some certainty.

The glacial-coastal plants would seem to be as a rule somewhat rare in the northern states, judging from the numerous lists of rare plants or additions to local floras which have appeared in RHODORA since its inception, several of which consist largely of just such species.<sup>2</sup>

The following species and genera might be added to the list of those confined to the glaciated region and coastal plain, or nearly so.

*Zizania aquatica* L. West to Manitoba, south to Florida, West Tennessee and Texas. Also in Asia (if it is all the same species). In the Atlantic coastal plain states this seems to be chiefly confined to brackish marshes, while in the glaciated region it is said to grow in lakes. There are some slight differences between the northern and coastal plants, which may indicate an incipient differentiation into two species.<sup>3</sup>

*Hemicarpha micrantha* (Vahl) Britton. West to Michigan and Nebraska, south to Florida, Illinois, Missouri and Mexico. (Not known in Georgia.) Also reported from the West Indies and South America, but there may possibly be more than one species involved.

*Carex bullata* Schk. West to Lycoming County, Pennsylvania

<sup>1</sup> See Hartz, Engler Bot. Jahrb. 36: 78-81. f. 1-4. Feb. 28, 1905, Berry, Bot. Gaz. 39: 232. March, 1905.

<sup>2</sup> For example the papers by Mr. Harger in June, 1900, Mr. Knowlton in June and October, 1900, Dr. Haberer in May and June, 1905, and Dr. Lewis in October, 1905; and my own in 1899 and 1900.

<sup>3</sup> See Brown & Scofield, Bull. 50, Bureau Plant Industry U. S. Dept. Agr. 1903; Scofield, Bull. 72 pt. 2. 1905.

(Porter) and south to Georgia (where I have collected it more than once), but with some considerable gaps in its known range.<sup>1</sup>

*Carex albolutescens* Schw. West to Pennsylvania (Porter) and Manitoba, south to Virginia (Kearney), Alabama (Mohr), Texas and Central America (?).<sup>2</sup>

*Carex alata* Torr. West to Michigan, south to Florida and Mississippi.<sup>3</sup>

*Carex sterilis* Willd. (*C. Atlantica* Bailey.) West to Pennsylvania, south to Florida and Mississippi.<sup>4</sup>

*Juncus militaris* Bigel. West to the Pocono region of Pennsylvania, south to Maryland.

*Iris versicolor* L., *Pogonia ophioglossoides* (L.) Ker, and *Limodorum tuberosum* L., common plants in the glaciated region, in Georgia seem to be strictly confined to the coastal plain and in West Virginia are each reported from only one county, but they are known from so many interior stations in other states that they are scarcely worth mentioning in this connection.

*Nelumbo lutea* (Willd.) Pers. West to Minnesota and Nebraska, south to Florida, Missouri and Texas.

*Nymphaea* (*Nuphar*). The species with floating leaves, three or four in the north and about the same number in the south, seem to be confined to the glaciated region and coastal plain, while the only one known in the Piedmont region is *N. advena*, with erect leaves.<sup>5</sup>

*Triadenum Virginicum* (L.) Raf. (*Elodes campanulata* Pursh). West to Manitoba and Nebraska (?), south to northern Florida and Louisiana.

*Vaccinium Oxycoccus intermedium* Gray (see Fernald, RHODORA 4: 237. 1902). West to British Columbia, south to southeastern Virginia (Kearney) and northeastern North Carolina (Croom, Am. Jour. Sci. 26: 316. 1834; as *Oxycoccus macrocarpus*).

*Sclerolepis verticillata* (Mx.) Cass. New Hampshire (*F. T. Lewis*<sup>6</sup>), and from New Jersey to Florida and Alabama (Mohr) in the coastal plain.

<sup>1</sup> See RHODORA 2: 69. 1900; 3: 51-52, 198. 1901.

<sup>2</sup> For notes on this species see Fernald, Proc. Am. Acad. 37: 472-473. 1902.

<sup>3</sup> See Fernald, l. c., 476.

<sup>4</sup> See Fernald, l. c. 485.

<sup>5</sup> See paper by Gerrit S. Miller, Jr. in Proc. Biol. Soc. Wash. 15: 11-13. f. 1. pl. 2. 1902, where two species are distinguished and an attempt is made to explain their distribution on climatic grounds.

<sup>6</sup> RHODORA 7: 186-187. 1905.

*Arnica*. In Eastern North America this genus has one representative very nearly confined to the coastal plain (barely reaching the Piedmont region in extreme southeastern Pennsylvania, and ranging from there southward to Florida), while the others seem to be confined to the glaciated region.<sup>1</sup>

If botanists residing near the terminal moraine and the fall-line will bear these plants in mind hereafter, they can doubtless furnish us with some interesting notes on their local distribution, and at the same time discover other cases of the same kind.

The following papers should be added to the bibliography of the subject.

ADAMS, CHAS. C. The postglacial dispersal of the North American biota. *Biol. Bull.* 9: 53-71. 1905.

Contains references to some earlier papers by the same author which should also be consulted.

BEAL, W. J. Michigan Flora. 147 pp. Lansing, 1904.

HARSHBERGER, J. W. The comparative age of the different floristic elements of Eastern North America. *Proc. Acad. Nat. Sci. Phila.* 56: 601-615. 1904.

HOLLICK, ARTHUR. Notes on Block Island [R. I.]. *Ann. N. Y. Acad. Sci.* 11: 55-88. 1898.

Pages 66-70 contain an interesting discussion of the origin of the flora.

MILLSPAUGH, C. F. Preliminary catalogue of the flora of West Virginia. *Bull. W. Va. Agric. Exp. Sta.* 2: 315-538. 1892.

PORTER, T. C. Flora of Pennsylvania. 362 pp. and map. 1903.

In this work the distribution of each species is given in detail, by counties, and it is readily seen that the coastal plain element of the flora is very nearly confined to the northeastern quarter of the state, which is glaciated.

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<sup>1</sup> See Fernald, RHODORA 7: 146. 1905.